

Evaluation of Proteinuria

1. General

- a. Definition: urinary protein excretion > 150 mg per day.
- b. Mechanisms
 - i. **Glomerular** (increased glomerular permeability; ****most common****), **Tubular** (decreased reabsorption due to tubular or interstitial disease), **Overflow** (increased amount of low M.W. proteins; i.e. multiple myeloma)
 - ii. Quantity gives a clue
 1. 150mg to 2 gm (mild glomerular, tubular, overflow) and >2gms usually glomerular disease

2. Diagnosis

- a. Urine dipstick is a not a quantitative but semi-quantitative test that can have both false positives (i.e. concentrated urine, infection, blood) and false negatives (i.e. dilute urine); easily done in clinic/rural; primarily detects albumin.
- b. Urine microscopy (casts, crystals, other clues)
- c. 24 hour urine protein collection \approx urine protein/creatinine ratio; quantitative
 - i. **LESS than 2 gm/24 hours**
 1. Transient = recent fever, stress, exercise (recheck after resolution)
 2. Orthostatic = patients < 30 yrs old who excrete <1- 2 g of protein per day; patients with increased protein excretion when standing but normal protein excretion when supine. Split urine specimens are obtained for comparison.
 - ii. **GREATER than 2 gm/24 hours**
 1. History (past medical, family history, symptoms- urinary, constitutional, MEDS)
 2. Physical Exam (blood pressure, weight, cardio, skin, edema, joints, retinopathy)
 3. Urine microscopy
 4. Other labs: renal function, lytes, CBC, protein and albumin, fasting glucose and lipids, HgbA1c, ANA, complements, hepatitis panel, HIV, SPEP, and possibly blood cultures (high risk or high suspicion to r/o endocarditis)
 5. Renal ultrasound (consider obtaining, especially if etiology unclear or referring to specialist).
 - iii. **Nephrotic syndrome**
 1. >3.5gm/24 hrs + low albumin (< 3.0) +edema + hyperlipidemia (can result in HYPERcoagulable state)
 2. Severe glomerular disease (i.e. poorly controlled/advanced DM, lupus...)
 3. Workup (as above); consider referral to nephrologist
- d. Underlying medical conditions
 - i. Diabetes mellitus: diabetic nephropathy seen in ~30%; recommendation is annual urine microalbuminuria and annual retinopathy exam (if retinopathy present, likely early glomerular damage even if normal renal function and small quantity of urine protein excretion). Treatment: tight glycemic control, ACE/ARB
 - ii. Hypertension: annual urinalysis with tight blood pressure control

3. Treatment and follow-up

- a. < 2gms/24 hours: treat any underlying condition, discontinue NSAID's, follow renal function and blood pressure
- b. >2gms/24 hours: treat or tight control of underlying condition, review medications closely, make sure patient has retinopathy screening exam if diabetic. If persistent and decreased renal function, consider nephrology consultation... especially if rapid worsening of renal function.

4. Articles/Algorithms

- a. Proteinuria in Adults: A Diagnostic Approach. Am Fam Physician. 2000 Sep 15;62(6):1333-1340 (good overview and algorithm)
- b. Nephrotic Syndrome in Adults: Diagnosis and Management. Am Fam Physician. 2009 Nov 15;80(10):1129-1134.
- c. Primary Care Approach to Proteinuria. J Am Board Fam Med. November-December 2008 vol. 21 no. 6: 569-574
- d. Preventing kidney failure: Primary care physicians must intervene earlier. Cleveland Clinic Journal of Medicine. 2003 Apr 4; vol. 70 , no. 4: 334-344.
- e. Up-To-Date